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ABSTRACT

This review of the research literature focuses on processes that Cautela (1972a) has called covert conditioning and Mahoney, Thoresen, and Danaher (1972) have called covert behavior modification. Both of these terms refer to processes for changing behavior through imaginal responses. Two general strategies have been employed. One has been to increase or decrease the power of a particular environmental stimulus to elicit a given response by pairing that stimulus with a pleasant or an aversive word, image, or feeling in imagination. Subjects are asked to vividly imagine the stimulus and to pair it with an aversive covert response if the purpose is to reduce the positive valence of the stimulus or a pleasant covert response if a positive valence is to be established or increased. A second strategy has been to have a target behavior, a behavior to be increased or decreased, performed in the imagination and followed by an imagined reinforcement or punishment. Thinking about making a response is regarded as an approximation to it (Homme, 1965). The expectation is that if the imagined stimulus and response are similar to the actual stimulus and response there will be a transfer from imagination to the actual situation through the process of stimulus generalization (Cautela, 1972). (Author)

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THE MODIFICATION OF COVERT BEHAVIOR:

A SURVEY OF THE LITERATURE

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Introduction

Early learning theorists were reluctant to allow mentalistic activity into the realm of scientific inquiry. Watson insisted upon reducing all psychological terms and constructs to behavioral observations and thereby eliminated the measurement and definitional problems inherent in the study of internal responses. Although Skinner (1953) recognized covert behavior as a legitimate area of scientific investigation, he did urge caution in attributing observed behavior to mental activities, which are themselves only inferred from overt behavior. Many researchers have misunderstood Skinner's cautionary remark as a warning to avoid the study of covert responses, although Skinner's actual view was that the study of internal responses is essential to a science of behavior (Thoresen and Mahoney, 1974).

Having overcome an initial reluctance to deal with internal responses, behaviorists currently have shown a great deal of interest in covert response processes (Bandura, 1969; Beck, 1970). Mahoney and Thoresen (1972) suggest that investigations of the role of covert processes in self-control may provide the link between behaviorism and humanism.

This review of the research literature focuses upon processes that Cautela (1972a) has called covert conditioning and Mahoney, Thoresen, and Danaher (1972) have called covert behavior modification. Both of these terms refer to processes for changing behavior through imaginal responses. Two general strategies have been employed. One has been to increase or decrease the power of a particular environmental stimulus to elicit a given response by pairing that stimulus with a pleasant or an aversive word, image, or feeling in imagination. Subjects are asked to vividly imagine the stimulus and to pair it with an aversive covert response if the purpose is to reduce the positive valance of the stimulus or a pleasant covert response if a positive valence is to be established or increased. A second strategy has been to have a target behavior, a behavior to be increased or decreased, performed in the imagination and followed by an imagined reinforcement or punishment. Thinking about making a response is regarded as an approximation to it (Homme, 1965). The expectation is that if the imagined stimulus and response are similar to the actual stimulus and response there will be a transfer from imagination to the actual situation through the process of stimulus generalization (Cautela, 1972).

That covert stimuli can influence the response rates of simple overt operants has received support in studies by Wish, Cautela, and Steffen (1970), Ascher and Cautela (1972), and Epstein and Peterson (1973). In these studies verbal responses to a stimulus were modified by cueing subjects to self-present pleasant or aversive imaginal scenes following each example of a particular class of responses. These studies were well controlled so that results could not be attributed to cueing itself or to demand characteristics. A study by Ripstra, Elson, Johnson, Schmickley, Rate, and Yager (1974) partially replicated the Wish, Cautela, and Steffen study.

Research by Mahoney, Thoresen, and Danaher (1972) supports the notion that covert behaviors are functionally related to their consequences, as Skinner (1965) and others have maintained. In a paired-associate learning task these researchers were able to increase or decrease subjects' use of imagery. This was done by giving or withholding small monetary rewards following self-reported use of imagery as an associative method. Because the use of imagery is known to facilitate paired-associate learning, the researchers used recall performance on the learning task in providing some verification of the subjects' self-reported use of imagery.

One might well argue that the literature on systematic desensitization belongs in a review of research on covert behavior modification. The use of systematic desensitization in the treatment of phobic responses might easily be considered as an example of the covert conditioning process that is the subject of this review. Wolpe (1958) certainly deserves credit for stimulating research in the use of covert processes to produce behavior change. We have chosen not to include the extensive literature on desensitization in this review as a matter of convenience rather than on theoretical grounds.

This review includes case studies and comparative group studies in which covert conditioning was used to modify a response. Detailed descriptions of various covert conditioning procedures are found in Cautela (1967, 1970a, 1970b, 1971a, 1971b, 1972) and in Thoresen and Mahoney (1974). We have organized the studies according to the three kinds of responses modified: 1) maladaptive approach responses, 2) maladaptive avoidance responses, and 3) maladaptive covert responses.

Maladaptive Approach Responses

Maladaptive approach responses include excessive eating, smoking, drinking, and other compulsive behaviors. A number of covert procedures have been used to reduce or eliminate these behaviors.

Case Studies

Covert sensitization. Cautela (1966) first used the term "covert sensitization" to describe a procedure particularly appropriate for maladaptive approach responses. In this procedure target behaviors symbolically represented in the imagination of a client are followed by imaginal consequences extremely aversive to the client. Cautela notes that systematic desensitization (Wolpe, 1958) has been used successfully with maladaptive avoidance responses but that traditional aversion therapy utilizing drugs or electric shock as the aversive stimulus has had only limited success with maladaptive approach responses. Cautela points out that the use of drugs as the aversive stimulus makes it difficult to control the unconditioned and conditioned stimulus pairings and that, although electric shock overcomes this difficulty, it also has disadvantages, the most notable of which is the fact that some clients avoid the therapeutic sessions.

In covert sensitization the client is taught to relax and then is instructed to imagine a typical situation involving the approach object, e.g., liquor or cigarettes. After the client signals that the image is clear, he is instructed to approach the desired object. Just as he is about to engage in the maladaptive behavior, he is asked to imagine himself feeling more and more nauseous until he begins to vomit on himself, the object, and others around him. The vomiting scene is graphically described by the therapist to enhance the aversiveness of the client's image. This sequence is repeated several times during each interview; further, the client is instructed to practice the scene each day at home. By pairing the stimulus object with an aversive covert stimulus in this manner, its positive valence is reduced. Cautela reports two cases in which covert sensitization was used successfully. The approach behaviors involved were excessive consumption of alcohol and overeating.

In a second paper Cautela (1967) classifies covert sensitization as an operant conditioning procedure which includes both a punishment contingency (drinking consequates vomiting) and a negative reinforcement contingency (as the client withdraws from the situation, the nausea disappears, and he feels better). Cautela emphasizes that these contingencies must be insured in order to produce a decrease in response frequency.

Although Cautela coined the term "covert sensitization," he is not the first behavior therapist to pair imagined aversive stimuli with imagined approach responses. Both Davison (1969) and Thoresen and Mahoney (1974) credit Lazarus (1958) with pioneering the use of imagery in aversive conditioning. Miller (1959) was also a pioneer of the procedure and like Lazarus utilized the technique with hypnotized clients. Miller instructed alcoholics to relive their worst hangovers and gave them opportunities to smell and taste alcohol during this imagined experience. He also gave them post-hypnotic suggestions that any desire they might have for a drink would result in thoughts about the hangover experience and thus reduce their desire for alcohol. Miller reports that 21 of 24 alcoholics abstained from liquor over a nine-month period following this treatment.

Another early use of imaginal aversive conditioning is reported by Gold and Neufeld (1965). A homosexual 16-year-old boy was encouraged to visualize himself in a typical place of solicitation, confronted only by an extremely unattractive and unpleasant old man. He was rewarded by the therapist with a "well done" when he raised his finger indicating that he felt he would not, under any circumstances, solicit such a person. The characteristics of the man he rejected were slowly changed to become more and more attractive. The image of a policeman, or some such inhibiting stimulus, was later introduced to insure that rejections were made. Finally, inhibiting stimuli were excluded from the images, and the client was asked to choose between an imagined attractive young man and an imagined attractive young woman. The authors report that he consistently made the appropriate heterosexual choice and subsequently abandoned homosexual practices and began to date females. Although some authors (e.g., Kanfer and Phillips, 1970; Thoresen and Mahoney, 1974) have classified it as such, this procedure should probably not be considered covert sensitization. Inasmuch as the client was being verbally reinforced for behavior

incompatible with homosexual responses - in this case, not soliciting - this procedure can be viewed as a variation of covert reinforcement (described later).

In the year following Cautela's original published account of covert sensitization, Anant (1967) and Kolvin (1967) report successful treatment of maladaptive approach behaviors with very smiliar procedures. Although apparently conducted independent of Cautela's work, Anant's treatment of alcoholics by a verbal aversion technique employed nausea and vomiting, like Cautela, as the imaginal aversive consequence to alcohol consumption. Kolvin, also apparently unaware of Cautela's article, reports successful treatment of fetishes and of petrol addiction using aversive imagery. Kolvin presented the maladaptive approach behavior as an integral part of a story the clients were instructed to imagine. The imaginal aversive stimuli which followed the story were selected from a list of dislikes previously generated by the clients.

The above five studies constitute the only deviations from the procedure standardized by Cautela in 1966 and 1967. All subsequent case studies using aversive imagery in the treatment of maladaptive approach behavior have conformed to and acknowledged Cautela's precedent. Extensions or revisions of the procedure have largely involved the kind of aversive stimuli employed.

Cautela and Wisocki (1971), in their work with a variety of sexual deviations (exhibitionism, fetishism, pedophilia, masochism, sadism, rape, homosexuality, and sadistic fantasies), prompted images of maggots crawling on the sexual object, bats flying into the subject's hair, and falling into a cesspool as aversive stimuli to develop avoidance responses.

Curtis and Presly (1972) report the use of more realistic stimuli to serve as the aversive event. A 31-year-old married male with a seven-year history of homosexual behavior was presented during therapy with two imaginal scenes. First, an unattractive male accosts him in a public restroom and threatens him with a knife if he does not participate in homosexual activities. The client manages to escape to his wife with resulting great relief. A second scene involves the client and an attractive male about to engage in homosexual activity when they are discovered by a woman, apparently the client's wife. He rushes home and experiences considerable relief when he finds that she is not the woman who discovered them after all. Davison (1969) reports the use of similarly realistic aversive imagery to control the unruly behavior of an eleven-year-old boy.

To enhance the aversiveness of imaginal noxious stimuli, Maletzky (1973) attempted the use of valeric acid, coincident with verbal suggestions of nausea and vomiting. Valeric acid is a malodorous substance initially used by Maletzky to help two clients who had some difficulty achieving realistic scenes of nausea and vomiting. He reports successful treatment of homosexuality and overeating with this procedure.

In a second paper on the use of valeric acid in covert sensitization, Maletzky (1974) presents graphic data showing a steady and rapid decline

in overt exposures by ten exhibitionists and also in the exhibitionists' thoughts about exposing themselves. Although both measures were self-reports, Maletzky did have access to police records as a means of checking the reliability of the overt exposures. A second and very innovative means of ascertaining the reliability of the self-reported improvement of the exhibitionists involved hiring a female to seductively provide the subjects with an opportunity for genital exposure in their natural environment. The opportunities came immediately after therapy and at a one-year follow-up. Maletzky reports only one relapse among the ten subjects.

Maletzky's data appears to be more substantial as evidence for the efficacy of covert sensitization than the clinical impressions reported in most case studies; nevertheless, it lacks the experimental control of an operant reversal or multiple baseline design. Controls for several confounding variables, such as the use of relaxation, client expectancy, and self-modeling (Thoresen and Mahoney, 1974), were not adequately provided.

One of the few intensive operant reversal designs which has attempted to demonstrate the efficacy of covert sensitization and to control for confounding variables is reported by Barlow, Leitenberg, and Agras (1969). Baseline data was first collected on the sexual responses of a pedophile and a homosexual. During a covert sensitization phase, their deviant sexual arousal declined rapidly. In the extinction phase which followed, the therapist described the maladaptive approach scene but remained silent during the 30 seconds previously used for the description of the noxious stimulus. As a result, deviant sexual responses rose dramatically; however, when the noxious stimulus was reintroduced, deviant sexual responses declined to zero.

Although this study has been cited by several authors (e.g., Bandura, 1969; Kanfer and Phillips, 1970; Cautela, 1971a; Goldfried and Merbaum, 1973) as an excellent controlled study of covert sensitization, Agras (1972), one of the study's authors, has criticized it on two counts. First, sexual responsiveness was measured by a self-report individualized card-sorting technique rather than a more objective measure like penile responsiveness. Second, the participants' expectancies may have been altered during the critical extinction phase of the study, since from the subject's viewpoint the therapeutic element was gone. Agras emphasizes the need for more controlled clinical studies.

Covert sensitization and covert reinforcement. Covert sensitization has been used with a variety of both overt (e.g., Stuart, 1967) and covert (e.g., Denholtz, 1973) behavior modification procedures to alter maladaptive approach behaviors. The two procedures most often used in combination with covert sensitization are covert reinforcement (Cautela, 1970a) and coverant conditioning (Homme, 1965). Both additional procedures are directed toward increasing responses considered to be incompatible with the maladaptive approach behavior. Because the techniques have been used in combination, it is impossible to isolate the critical procedure or combination of procedures when change is effected (e.g., Tooley and Pratt, 1967). However, these studies, which are rich in the imaginative application of behavioral technology to human problems, should serve to model successful therapist behavior and to stimulate further research.

Covert reinforcement and covert sensitization have been successfully combined as the major treatment interventions in modifying a variety of maladaptive approach behaviors. This particular combination of procedures is selected to decrease the frequency of the maladaptive approach behavior (covert sensitization) and to increase the frequency of responses incompatible with the maladaptive approach behavior (covert reinforcement). Azrin and Holz (1966) cite laboratory evidence which suggests that this particular combination will maximize the elimination of a response by punishment.

A representative example of this procedure is reported by Cautela and Baron (1973). The client was a 20-year-old male college student who had blinded himself by poking his eyes with his fingers and had bitten his lips and tongue enough that plastic surgery was required to repair them. The client was told that he had learned these behaviors and that he could unlearn them. He was first taught to relax and then to use relaxation as a self-control strategy whenever he felt tense or had an urge to engage in self-injurious behavior. To increase the relaxation response, it was reinforced by pleasant imaginal scenes. Covert sensitization was employed as a means of reducing the actual self-injurious behavior. Finally, thought-stopping (covertly shouting "STOP!" at intrusive thoughts; see Wolpe, 1958) was suggested to help control thoughts which frequently served as antecedents to self-injury. The authors report successful treatment and note that, although blind, the client married and is functioning quite well.

Another case of obsessive-compulsive behavior successfully treated by covert sensitization and covert reinforcement is reported by Wisocki (1970). Other maladaptive approach behaviors in which covert sensitization and covert reinforcement have been judiciously combined include homosexuality (Cautela, 1970a), overeating (Cautela, 1972), and heroin addiction (Wisocki, 1973b).

Covert sensitization and coverant conditioning. Coverant conditioning functions as an adjunct to covert sensitization in the treatment of maladaptive approach behaviors much as does covert reinforcement. That is, coverant conditioning is a procedure used to strengthen responses incompatible with the maladaptive approach response. There are several notable differences, however. In coverant conditioning, the target behavior is a covert verbal statement or "covert operant" (e.g., "smoking causes cancer") considered incompatible with the undesired approach response (e.g., smoking). The target behavior in covert reinforcement, on the other hand, is an imaginal representation of an overt behavior thought to be incompatible with smoking (e.g., refusing a cigarette). The contingent consequences used to increase these target behaviors also differ between the two procedures. In coverant conditioning, overt high-probability behaviors (HPBs) are used to increase the frequency of the target coverant, while in covert reinforcement, a pleasant imaginal scene serves as the reinforcer. Note that emphasis is placed on the covert target behavior in coverant conditioning and on the covert consequences in covert reinforcement.

In a now classic paper, Homme (1965) speculated that extrapolation

of the Premack principle to increase the response frequency of certain coverants could modify overt behaviors. If, for example, a person desires to give up smoking, an HPB, e.g., drinking coffee, is selected and made contingent upon a chain of thoughts about smoking. The sequence of events would be as follows: The subject desires a cigarette. He pauses and ponders something he considers very aversive relative to smoking (anti-smoking coverant). He then thinks of something positive about not smoking (pro-non-smoking coverant). Finally, he engages in the HPB (has a cup of coffee). The coverants in this chain of responses serve two purposes. They elicit physiological and emotional responses associated with adaptive avoidance behavior (Goldfried and Merbaum, 1973), and they serve as approximations of overt adaptable avoidance responses.

The function of coverants as "cues" or symbolic mediators of emotional reactions (in this case incompatible with smoking) has been established (Velten, 1968; Rimm and Litvack, 1969; Staats, 1972). However, the extrapolation of the Premack principle to coverant control is fraught with methodological and theoretical problems (Mahoney, 1970; Danaher, 1972; Thoresen and Mahoney, 1974). One such problem concerns the confusion between the frequency of high-probability behaviors and their probability. The probability of a response can only be determined in a free operant situation, and only a response which has a high probability relative to another response can be used contingently to reinforce the other response. "Nonetheless, mundane responses such as turning on a kitchen faucet and answering the telephone have been employed as contingent reinforcers" (Thoresen and Mahoney, 1974, p. 90).

Given the relativity of an HPB, a problem related to the probability-frequency issue is that the HPB should decline in frequency when contingently applied to a response of lower probability. However, when intrinsically maintained responses whose frequency does not decrease (e.g., coffee drinking) are employed as consequences, their reinforcing potency can be called into question. Clinicians and researchers both must be cognizant of these problems in utilizing the Premack principle in coverant conditioning.

The misapplication of this principle by therapists reporting successful treatment suggests that client expectancy or non-specific relationship variables, rather than coverant conditioning, may have effected the change. One such case in which both the Premack principle is misapplied and in which the relative efficacy of coverant conditioning is obscured by the additional use of covert sensitization is reported by Shealy (1972). He successfully treated a homosexual who desired to change his sexual preference by first attacking his heterosexual fears as irrational (Ellis, 1962). Homosexual thoughts were then punished via covert sensitization. Finally, coverant control was employed, using urination as an HPB to increase the frequency of positive heterosexual thoughts. Urination, however, can hardly be called a reinforcer, since it seems unlikely that its frequency would decrease when made contingent on low probability coverants.

In another attempt at treating homosexuality, Kendrick and McCullough (1972) discuss a fascinating application of Homme's use of the Premack principle to homosexual fantasies. The authors used homosexual fantasies

to reinforce heterosexual ones. Initially, each heterosexual fantasy described by a therapist was reinforced with a homosexual one. Slowly, the reinforcement schedule was increased to FR-5. At this point, covert sensitization was introduced to eliminate homosexual imaginal behavior altogether, and non-sexual, positive images were used to reinforce imaginal heterosexual behavior. The authors report a rapid and permanent decline in the number of homosexual "urges" (self-report) and also note that the client was dating a girl on a regular basis at a three-month follow-up.

Other techniques. As noted earlier, Cautela (1967) made covert negative reinforcement an integral part of the covert sensitization procedure by instructing subjects to imagine leaving the situation that had become so repulsive to them and thus escape the aversive stimuli. Cautela (1970b) has also suggested the use of covert negative reinforcement independent of covert sensitization. First, an aversive event is verbally detailed by the therapist and imagined by the client. Note that the aversive stimulus is not made contingent upon any other behavior, as in covert sensitization. When the aversive situation is clearly established in the imagination of the client, he is asked to "shift" (escape) to a scene involving the behavior to be increased. Cautela suggests this procedure with clients who find it difficult to imagine positive scenes which could be used in covert reinforcement. Its applicability seems most appropriate with maladaptive avoidance behaviors, but Cautela notes that it has been used successfully in the treatment of approach behaviors such as smoking marijuana, homosexuality, and obesity.

Covert extinction (Cautela, 1971b) is also reported as successful in modifying maladaptive approach behaviors. For example, a boy who was extremely disruptive in class was told to imagine his behavior without its being followed by an attending response from either his teacher or his classmates. In another example, Cautela relates that a homosexual was instructed to imagine entering a gay bar without attracting attention. Theoretically, covert extinction can be effective only if the reinforcement of the maladaptive behavior is correctly identified. In the above examples, attention was assumed to be the reinforcer for the maladaptive approach behavior. The identical target behavior in another client, however, might not be reinforced by attention, and eliminating the imaginal consequences of attending responses from others would not decrease its frequency. To date, the efficacy of covert extinction remains only a clinical impressions.

Comparative Group Studies

The relative ease of obtaining subjects makes smoking and overeating popular target behaviors for testing behavior control procedures. There is yet to be a well-controlled experiment that clearly demonstrates the effectiveness of covert sensitization in the reduction or elimination of smoking. Studies by McCallum (1970), Sachs, Bean, and Morrow (1970), Wagner and Bragg (1970), and Fuhrer (1970) compared covert sensitization alone or in combination with other techniques in the control of smoking. Their findings offer little support for the effectiveness of covert sensitization. In the studies by Sachs, Bean, and

Morrow (1970) and Fuhrer (1971), covert sensitization groups failed to reduce smoking any more than placebo attention groups. Gerson (1970) found covert sensitization alone or in combination with systematic desensitization directed at reducing the aversive consequences of quitting to be more effective than an effort control procedure but that covert sensitization in combination with a modeling treatment produced no better results than the effort control.

Steffy, Meichenbaum, and Best (1970) designed an experiment in which subjects escaped shock by overtly or covertly verbalizing an absence of desire for a cigarette. Although a six-month follow-up indicated the covert verbalization group to be superior in reducing cigarette consumption, the effects cannot be separated from those of the behavioral rehearsals that were also part of the treatment. In a related study, Berecz (1972) compared the self-administration of shock to the actual or imagined smoking of moderate smokers. The overt consequence, electric shock, applied to imagined smoking was as effective in reducing cigarette consumption as electric shock applied to actual smoking. With heavy smokers, the aversive consequence following the imagined smoking produced better results.

Manno (1971) used covert sensitization to test the notion that it is better to present punishment early in the response sequence than at the end. Overeating was the target behavior. One covert sensitization group self-administered covert punishment after imagining eating; a second group applied the covert punishment after imagining the anticipation of eating; and a third self-administered covert punishment after both the anticipatory and consumatory responses. Two additional groups imagined the consumatory response or the anticipatory response but not the covert punishment. Differences in weight loss were not found to be related to the point in the response sequence chosen for covert punishment. A result of interest was that the mean weight loss of subjects in the two groups in which covert punishment was not used was greater than the mean weight loss in the three covert sensitization groups.

Manno and Marston (1972) compared a covert sensitization group to covert reinforcement and control groups in producing weight loss. The covert reinforcement group imagined abstaining from food and feeling wonderful. The control group met and discussed nutrition. Both treatment procedures produced more weight loss than the control procedure but were not different from one another.

Ashem and Donner (1968) reported the use of covert sensitization with alcoholics in a six-week treatment program. The criterion measure was abstinence six months later. The researchers departed from Cautela's procedure in that some subjects in the covert sensitization group were asked to imagine feeling nauseous prior to the introduction of the imagined drink. The differential effects of presenting the covert aversive stimulus before or after the presentation of the target behavior were to have been tested but were not. Six of the fifteen males in the covert sensitization group were dry six months later, while none of the eight in the no-contact control group were dry.

Covert sensitization can be understood within a classical conditioning

framework as counterconditioning or in an operant paradigm as punishment. Williams (1972) attempted an experiment that might have given support to one or the other of these conceptual models but failed to find significant differences relating to his hypothesis.

Maladaptive Avoidance Responses

Maladaptive avoidance responses are reactions to debilitating fears elicited by specific stimulus objects or situations. Establishing approach responses to these feared objects or situations has generally employed systematic desensitization - the graded presentation of the feared stimulus either in vivo or in imagination. We have noted that a review of the systematic desensitization literature is beyond the scope of this paper. Other covert procedures, however, have recently been suggested as appropriate in the treatment of avoidance behaviors.

Desensitization focuses on the anxiety producing stimulus and attempts to reduce stimulus strength through repeated presentations of the actual stimulus or its symbolic representation. In treating maladaptive avoidance responses with covert reinforcement, researchers have subjects present themselves with the aversive stimulus in imagination and then pair this image with an imagined pleasant word, feeling, or scene. This approach may also include an imagined adaptive response to the aversive stimulus, followed by an imagined reinforcement. The negative valence of the stimulus is reduced through pairings with positive thoughts, and approach responses are reinforced in imagination with the expectation that the increased probability of such responses will generalize to similar situations in the actual environment.

Encountering the feared object or situation in imagination and visualizing an adaptive response to it has been called covert rehearsal or covert modeling. No important distinction is made between the two terms. Such imagined encounters are generally part of covert reinforcement - covert approach responses reinforced by an imagined scene - but there have been attempts to test the effects of covert modeling or rehearsal independent of covert reinforcement.

Case Studies

Very few case studies report the use of covert operant procedures to modify maladaptive avoidance behaviors. Those which do are grouped according to the technique used and presented below.

Covert reinforcement. The covert operant procedure most frequently used by therapists, either alone or with other procedures, has been overt reinforcement. Recall that this technique involves relaxation training, selection and rehearsal of imaginal reinforcing scenes, and, finally, instructions from the therapist to the client to shift to the reinforcing scene, contingent upon imagining successive approximations of the target behavior.

Using an operant reversal intensive design, Blanchard and Draper (1973)

sought to establish the efficacy of covert reinforcement in treating a rat phobic. Six dependent measures were used: two behavioral measures - approach behavior and heart rate - and four paper and pencil measures. The experiment was conducted in five stages: 1) insight oriented therapy, 2) covert reinforcement, 3) covert imagined approach responses without the reinforcement, 4) extinction, and 5) a participant modeling stage. Results indicate that covert reinforcement was more effective than insight therapy and that participant modeling also increased approach responses. However, decreases in dependent measures were not obtained in either stage three or stage four. Whether imagined exposure to rats is sufficient to develop approach behavior or whether contingent imaginal reinforcement is necessary cannot be ascertained from this study.

Suinn (1972) discusses the successful treatment of extreme anxiety in a doctoral student concerned with his performance on his doctoral orals, which he had flunked twice. Suinn instructed the client to visualize himself successfully and confidently answering questions in front of his doctoral committee. He was further instructed to attend to the good feelings he had while visualizing this scene and thus was covertly reinforced for more assertive behavior.

Flannery (1972a; 1972c) reports two successful applications of covert reinforcement concomitant with other covert techniques in the treatment of a drug-dependent college drop-out and an agoraphobic.

Covert negative reinforcement. Cautela (1970a; 1971a) suggests the use of covert negative reinforcement to modify maladaptive avoidance response. Successful use of this technique is reported with school phobia, fear of leaving the house, impotence, and a fear of breeses.

Covert extinction. Cautela (1971b) suggests the use of covert extinction with certain maladaptive avoidance behaviors. For example, a wife afraid of being left alone by her husband was instructed to imagine her husband leaving with nothing happening while he is gone.

Covert modeling and covert rehearsal. Thoresen and Mahoney (1974) note that all covert conditioning procedures which involve performance scenes in essence involve covert modeling or covert rehearsal. However, covert modeling and rehearsal are used without contingent consequences, as in other procedures. Flannery (1972a; 1972c) used covert modeling in both of the cases reported above. The client was instructed to imagine a model of like sex and similar age performing the appropriate target behaviors without experiencing anxiety. Since covert reinforcement was also used, the differential effects of either procedure cannot be examined. Covert rehearsal is reported as a successful technique in developing assertive behavior by both Susskind (1970) and Yarnell (1972).

Comparative Group Studies

Covert reinforcement. Flannery (1972b) compared the covert reinforcement of imagined approaches to a rat, covert reinforcement of actual approaches to a rat, and a control procedure. Both covert procedures produced more approach behavior than the control but were not found to be different from one another.

Wisocki (1973) tested a covert reinforcement procedure to reduce test anxiety. One member of each 18 matched pairs of female college students was assigned to the experimental treatment and the other to a delayed treatment control. In five 50-minute sessions, subjects in the experimental group practiced imagining going to an exam, feeling calm during exams, and performing well. Following each imagined performance, a reinforcing scene was imagined. Subjects were asked to practice such imagery 10 times a day at home during the four weeks in which treatments were conducted. The subjects in the experimental group reported greater reduction in anxiety associated with actual testing than did controls. The researcher cautioned that the experimental design did not control for non-specific placebo effects nor for possible interaction between experimenter and subjects.

Hekmat and Vanian (1971) conducted an experiment using a procedure they called semantic desensitization. It was similar to the above covert reinforcement studies except that imagined words were paired rather than imagined scenes. Subjects in this experiment paired in imagination 18 pleasurable words with the word snake. Control subjects paired the same 18 words with the word peach. On a self-report measure of fear of snakes, and on approach behavior to live snakes, the experimental group demonstrated less fear and greater approach than the controls. In another test of this procedure, Hekmat (1972) compared a group who in imagination paired the word spider with each of 18 pleasurable words to a group who said each of the same pair of words aloud. Both of these treatment groups subsequently showed less fear of spiders than did a control who had paired the pleasurable words with the word apple, but they did not differ significantly from one another.

In a third study, Hekmat (1973) compared the same semantic desensitization with systematic desensitization and implosion. Systematic desensitization and semantic desensitization did not differ from each other in reducing fear of a rat in this study and were both superior to implosion and control procedures. More efficiency was claimed for semantic desensitization over the systematic desensitization procedure.

Taken together, the Hekmat studies lend support to the theoretical framework from which Staats (1972) has developed language behavior therapy. Staats maintains that much of human behavior is under the control of previously acquired language repertories and that behavior changes can be effected solely by altering the positive and negative valences of words which represent objects.

Another area of research relevant to covert reinforcement has been the investigation of the relative efficacy of imagery in producing overt behavior change. Melville (1971) attempted to test the relative effectiveness of a desensitization treatment in reducing fear of snakes. The positive images in this study, however, were not linked to images of a snake. The desensitization group exhibited more approach behavior than did the positive image group.

Another study which investigated the influence of positive imagery in desensitization procedures was conducted by Perloff (1970). His

procedure differed from Melville's in that positive, as well as neutral, images were paired with images of snakes. Subjects who had, in imagination, paired items from a snake fear hierarchy with pleasant or neutral scenes demonstrated less fear of snakes than did those subjects who had been presented with the items from the hierarchy but with no positive or neutral images. These results suggest that the imaginal scenes typically used in systematic desensitization may contribute far more to the success of the procedure than formerly thought.

Covert modeling and covert rehearsal. Kazdin (1973b) compared covert modeling with a procedure that combined overt modeling and covert reinforcement in increasing assertive behavior. Four treatments were compared. College students in the covert modeling group imagined situations in which assertiveness would be appropriate and imagined a model who made assertive responses. Subjects in the covert model plus reinforcement group imagined the above scene and, in addition, imagined a desirable consequence following the model's assertive response. Subjects in one control group imagined the same situations, including a model, but were not asked to imagine the model's assertive response. A no-treatment control was also used. The dependent variable was assessed using self-report and behavioral measures. Covert modeling increased assertiveness, and the addition of covert reinforcement further enhanced the treatment's effectiveness.

Coping and mastery models were compared by Kazdin (1973a) in a further test of covert modeling. Models were presented in imagination. The coping model was imagined as initially anxious but eventually able to perform the task - handling a snake. The mastery model was confident from the outset while performing the same task. Subjects were randomly assigned to the coping and mastery model treatment and to the two control procedures. An imagery control had subjects visualize the scene without the model interacting with the snake. A delayed treatment control was used with the fourth group. The coping model group performed best on the behavioral measure of approach to a real snake, but the mastery model group indicated the most favorable attitudes toward snakes.

Donaldson (1972), using covert rehearsal, had subjects imagine feeling safe in the presence of a snake, approaching it, feeding it, and making friends with it. He called this a positive imagery technique and compared it to implosive therapy. Both positive imagery and implosion groups showed less fear of snakes than did the control group, but no differences were found between the two treatment groups.

Meichenbaum (1972) compared a procedure he called cognitive modification to systematic desensitization and to a delayed treatment control in reducing test anxiety. Cognitive modification included making subjects aware of anxiety-producing self-verbalizations and strategies for inhibiting these much as proposed by Ellis (1962). The procedure also included a coping imagery model. The cognitive modification procedure reduced self-reported anxiety and increased test performance more than did the desensitization treatment. Covert modeling was only part of the procedure, and its separate effects cannot be assessed in this experiment.

Coverant control. A number of experimental studies have tested Homme's application of the Premack principle to control maladaptive approach responses. Johnson (1968), Gardner (1970), Hark (1970), Lawson and May (1970), and Gordon (1970) used coverant control procedures to reduce or eliminate smoking. Taken together, these studies provide little support for Homme's extrapolation of Premack's principle. Highly probably behaviors, as defined in these studies, were not found to have an influence on the frequency of anti-smoking thoughts or on smoking behavior. The relationship between modifying thoughts about smoking and modifying smoking itself was not established in these studies.

Studies using coverant control of overeating by Tyler and Straugham (1970), Horan and Johnson (1971), and Horan, Baker, Hoffman, and Shute (1974) lend some support to the notion that coverants incompatible with eating influence eating behavior. The management of HPBs, however, was not shown to have contributed to more frequent coverants or to weight loss. The study by Horan et al. (1974) found that positive coverants - thoughts of how nice it would be to be slim - were more effective than negative coverants - thoughts of the aversive consequences of being overweight.

Homme's coverant control strategy has yet to be firmly established by research as a viable procedure for treating maladaptive avoidance responses. However, it has stimulated a great deal of general interest in the area of covert behavior modification and remains a promising technique.

Maladaptive Covert Responses

Included in this section are case studies and comparative group studies which deal with thoughts, fantasies, and feelings as the target behaviors selected for treatment. Recall that studies in the other two sections report attempts to modify overt behavior by 1) insuring that imaginal antecedents and consequences are applied appropriately to imaginal representations of the target behavior or 2) influencing the frequency of coverants in an appropriate direction. In this section, covert responses are modified by both covert and overt procedures, not because they will ultimately influence overt behavior, but because they are considered a problem in their own right by the client and the therapist. Along this line, Ince (1972) has noted that changes in overt behavior do not insure concomitant changes in covert behavior.

Case Studies

Bothersome sexual fantasies, obsessive thoughts, depressions, and self-evaluative thoughts are all targets for change in the case study literature. Case studies are organized below by the techniques employed.

Coverant conditioning. Johnson (1971), Mahoney (1971), and Todd (1972) report the successful use of coverant conditioning in the treatment of depression. Each therapist attempted to increase his respective

client's positive self-evaluations by having him read positive self-statements printed on 3x5 cards prior to engaging in an HPB. An interesting innovation suggested by Mahoney was the use of a blank 3x5 card, which was to serve as the cue for an original positive self-statement from the client. In addition, Mahoney employed an attentional distraction (counting backwards) and a tactile aversion (self-punishment via a rubber band snapped against the wrist) to decrease obsessive thoughts concerning brain damage, oddness, and persecution. Although successful, all three studies are subject to the criticism leveled at the use of intrinsically rewarding HPBs discussed earlier in this paper.

In two different variations of coverant conditioning, Hannum (1972) used a cueing procedure to increase positive self-thoughts, while Jackson (1972) instructed his client to reward herself with tangible, as well as covert, reinforcers for engaging in positively evaluated behaviors. Jackson's data suggests that an element of covert self-reinforcement that may be crucial for some clients is initially requiring the client to administer a tangible reinforcer simultaneously with positive self-evaluations. The use of tangible reinforcers encourages the person to engage deliberately and overtly in acts of positive self-evaluation.

Covert sensitization. Davison (1969) and Marquis (1970) successfully attempted to alter client responses to deviant sexual images. In addition to covert sensitization, Davison reports that his client was helped to reduce sexual arousal potency of sadistic fantasies by first pairing appropriate pictures (attractive nude females) and later images with masturbation. Marquis also used this procedure and labeled it "orgasmic reconditioning."

Denholtz (1973) used covert sensitization to suppress a client's obsessional thoughts concerning her ex-lover and her doubts about her love for her husband. In the homework assignments, the client was assisted by tape recordings in imagining covert sensitization scenes.

Comparative Group Studies

To date, covert reinforcement has been the only covert conditioning procedure subjected to empirical analysis in the modification of covert target responses. Two experimental studies have focused on the effects of covert reinforcement in attitude change. Cautela and Wisocki (1969) used pre-and post-test measures of attitude toward the elderly to determine whether or not covert reinforcement was able to produce more favorable attitudes. Subjects in the experimental condition practiced imagining a scene in which they were injured in an auto accident and helped by an elderly man. They also were asked to picture themselves as the old man in the scene. Experimental subjects were told to practice these scenes twice a day for 10 days, at which time the post-test attitude measure was administered. Although a control group was used, the attitudes of the experimental group were not directly compared with those of the control group, but rather the pre-post-test differences for each group were tested separately. Their conclusion that the covert reinforcement treatment was effective, based on their statistical analysis, should be regarded with caution.

In another study, Cautela, Walsh, and Wish (1971) had experimental subjects imagine a mentally retarded person and then pair the image with an idiosyncratic pleasant scene, also in imagination. The control subjects were asked to imagine a normal person. Change scores on pre- and post-tests of attitude toward the mentally retarded showed the experimental group to have more positive attitudes than the control group.

Krop, Calhoon, and Verrier (1971) report the use of covert reinforcement to modify the self-concept of emotionally disturbed children. Thirty-six children were randomly assigned to three conditions: covert reinforcement, overt reinforcement, and a control group. The experiment used three administrations of 34 items from the Tennessee Self-Concept Scale. The first administration was a pre-test, the second a treatment. Subjects in the covert reinforcement group were asked to present themselves with a pleasant imaginal scene each time they responded to an item on the scale in a manner indicating a positive self-concept. The overt reinforcement group was rewarded with a token and a gumdrop for positive responses. Subjects in the control group were given the Self-Concept Scale for the second time in the same manner as the first. A third administration of the scale to all subjects was used to provide one criterion measure. The only significant pair-wise comparison was between the covert reinforcement group and the control. The covert reinforcement group had the higher self-concept.

Conclusion

The large number of recent studies dealing with the covert antecedents and covert consequences of behavior and how these influence overt behavior reflects the great interest in this relatively new area of investigation. As is often the case in such pioneering efforts, there have been overenthusiastic claims made for covert conditioning procedures based upon clinical observations or inadequately controlled experiments, and later there have been disappointments when clinical "discoveries" were subjected to rigorous experimental test. However, results support the notion that covert responses can be altered by reinforcement and punishment and that covert processes do exert an influence on overt behavior. Thus, research in this area of investigation continues to show promise.

The development of a technology for modifying covert responses to assist individuals in developing behavioral self-control is perhaps possible. However, considerable research is needed to better understand the relationship between overt and covert responses and to develop such a technology.

Research on covert processes is especially difficult because covert responses can be observed only by the individual experiencing them. The reliability of self-reports has been seriously questioned (Simkins, 1971; Lipinski and Nelson, 1974) and is of special concern in these investigations of mental activities.

In spite of the difficulties, this area of investigation provides rich opportunities for research. Especially needed are replications of key studies and studies which attempt to isolate the effects of single elements in complex covert treatment procedures.

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